

**WHAT IS CLAIMED IS;**

1. A motor controller comprising an AC motor, a power converter for applying a voltage to said AC motor by a PWM signal generated by comparing a command value with a carrier, and a controller for detecting a rotor position of said AC motor and controlling said command value, wherein:

said controller detects said rotor position on the basis of a difference between a real current differential vector and a reference current differential vector.

2. A motor controller comprising an AC motor, a power converter for applying a voltage to said AC motor by a PWM signal generated by comparing a voltage command value with a carrier, and a controller for detecting a rotor position of said AC motor and controlling said voltage command value, wherein:

said controller has a first phase current detection unit for detecting respective current differentials changed by respective voltage vectors applied in a plurality of sections, a reference phase current differential calculation unit for calculating reference phase current differentials obtained by said plurality of voltage vector differences, and a position detection unit for detecting said rotor position of said AC motor using said current differentials and said reference phase current differentials.

3. A motor controller comprising an AC motor, a power converter for applying a voltage to said AC motor by a PWM

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- 53 -

signal generated by comparing a voltage command value with a carrier, and a controller for detecting a rotor position of said AC motor and controlling said voltage command value, wherein:

5       said controller has a current detection unit for detecting a current of said AC motor in synchronization with said carrier, a detection phase decision unit for calculating a detection position decided by said voltage and said detected rotor position, and a position detection unit for detecting said 10 rotor position by using a component of said detection phase of said current vector.

4.       A motor controller comprising an AC motor, a power converter for applying a voltage to said AC motor by a PWM signal generated by comparing a voltage command value with 15 a carrier, and a controller for detecting a rotor position of said AC motor and controlling said voltage command value, wherein:

      said controller has a current detection unit for detecting respective current differential vectors changed by respective 20 voltage vectors applied in a plurality of sections, a reference current differential vector calculation unit for calculating reference current differential vectors obtained by said plurality of voltage vector differences, and a position detection unit for detecting said rotor position of said AC 25 motor using differences between said current differential vectors and said reference current differential vectors.

5. A motor controller comprising an AC motor, a power converter for applying a voltage to said AC motor by a PWM signal generated by comparing a voltage command value with a carrier, and a controller for detecting a rotor position  
5 of said AC motor and controlling said voltage command value, wherein:

10 said controller has a current detection unit for detecting a current of said AC motor at a point of time when said carrier reaches close to a center value and a position detection unit  
10 for detecting said rotor position of said AC motor using said detected current.

15 6. A motor controller according to Claim 2, wherein said first phase current detection unit has a function for removing a DC component.

20 7. A motor controller according to Claim 2, wherein said controller has a second phase current detection unit for detecting phase currents of two phases unlike said first phase current detection unit.

20 8. A motor controller according to Claim 7, wherein said controller has an error detection unit for detecting an error in said phase current detection units on the basis of AC components of said phase currents detected by said first and second phase current detection units.

25 9. A motor controller according to Claim 3, wherein said current detection unit detects a current at a point of time when said carrier reaches close to a center value.

10. A motor controller according to Claim 3, wherein  
said controller has a reference current vector calculation  
unit for calculating a detection phase component of a reference  
current vector for said voltage and detects said rotor position  
5 on the basis of said detection phase component of said reference  
current vector and said detection phase component of said  
current vector.

11. A motor controller according to Claim 4, wherein  
said current detection unit detects currents at a plurality  
10 of points of time when said carrier reaches close to a center  
value and obtains said current differential vectors on the  
basis of said plurality of currents.

12. A motor controller according to Claim 4, wherein  
in said controller, a detection phase decision unit for  
calculating a detection phase decided by said voltage and said  
15 detected rotor position has a position detection unit for  
detecting said rotor position using detection phase components  
of said differences of said current differential vectors and  
detection phase components of said reference current  
differential vectors.

13. A motor controller according to Claim 5, wherein  
said controller has a detection phase decision unit for  
calculating a detection phase decided by said voltage and said  
detected rotor position and a position detection unit for  
25 detecting said rotor position using a detection phase component  
of a current vector.

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14. A motor controller according to one of Claims 3,  
9, 11, 12, and 13, wherein said controller has a detection  
phase changing unit for changing said detection phase by adding  
a zero-phase voltage to said voltage.

5 15. A motor controller according to Claim 3 or 4,  
wherein said controller switches current detection timing  
according to a motor speed.

10 16. A motor controller according to Claim 15, wherein  
said current detection timing is a point of time when said  
carrier reaches a maximum value or a minimum value when said  
motor speed is low and a point of time when said carrier reaches  
close to a center value when said motor speed is high.

15 17. A motor controller comprising an AC motor, a power  
converter for applying a voltage to said AC motor by a PWM  
signal generated by comparing a command value with a carrier,  
and a controller for detecting a rotor position of said AC  
motor and controlling said command value, wherein:

20 said controller has a calculation unit for deciding a  
detection voltage to be added to said command value on the  
basis of said detected rotor position and deciding a reference  
current variation which is a standard for current changes,  
a first phase current detection unit for detecting a current  
variation for said detection voltage, and a position detection  
unit for detecting said rotor position of said AC motor on  
25 the basis of said reference current variation and said current  
variation.

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18. A motor controller comprising an AC motor, a power converter for applying a voltage to said AC motor by a PWM signal generated by comparing a command value with a carrier, and a controller for detecting a rotor position of said AC motor and controlling said command value, wherein:

said controller has a phase current detection unit for detecting a current variation for said command value and a position detection unit for detecting said rotor position of said AC motor on the basis of a one-phase current variation.

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